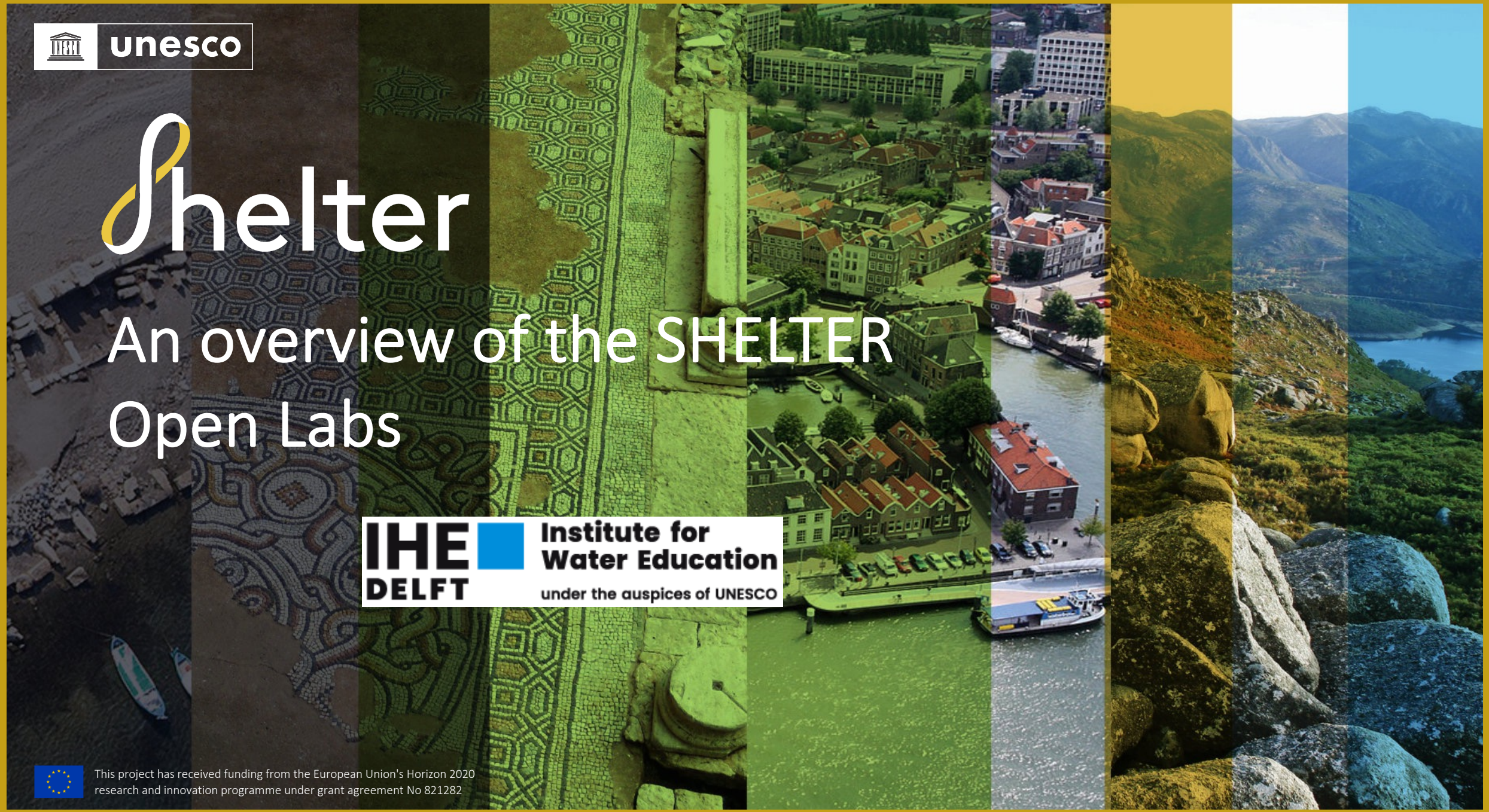
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 821282



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The group work in a nutshell

The main objective of the working group was the implementation of a community-centered approach based on five Open Labs operating as knowledge generators, evaluation frameworks, and demonstration sites.

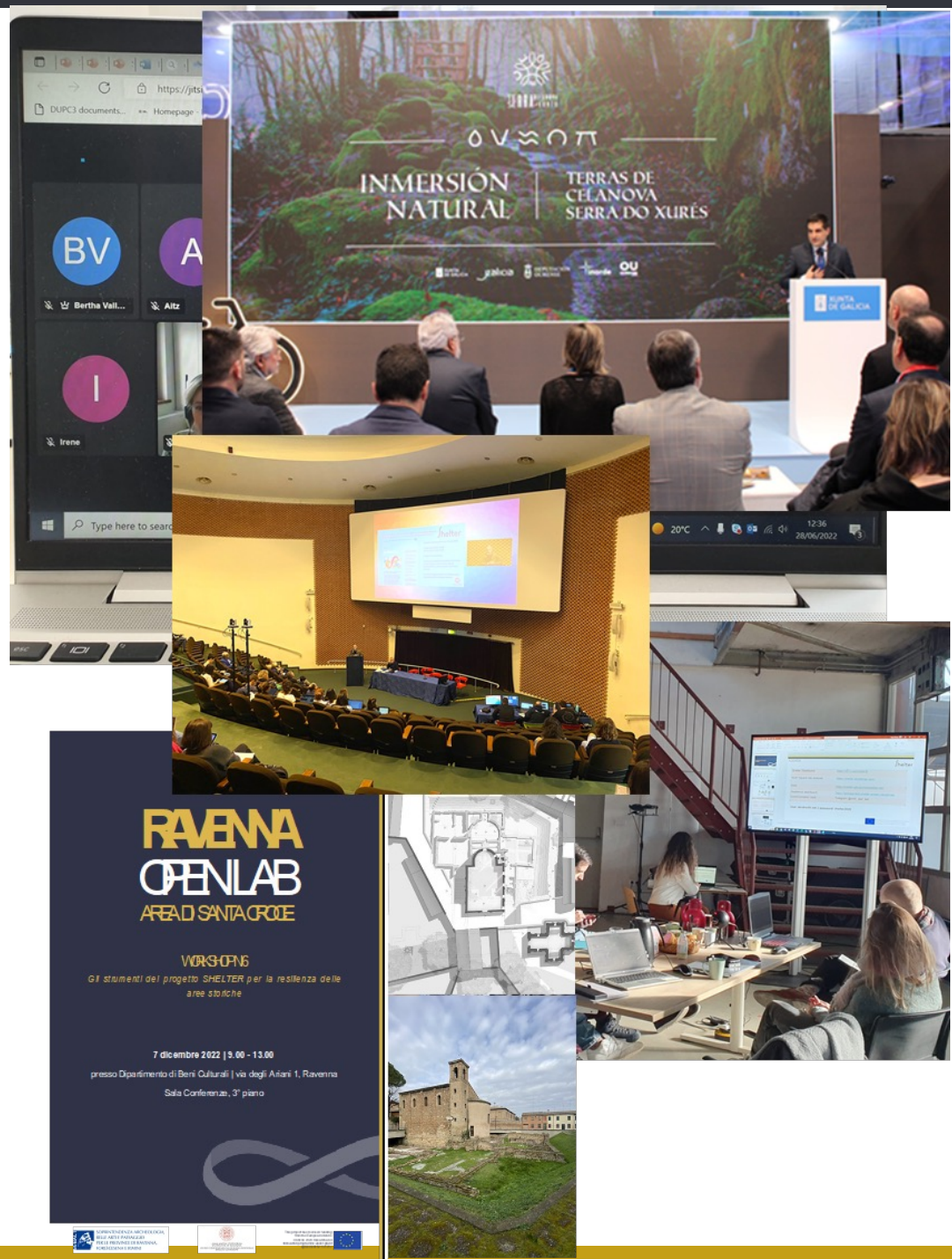
Open labs and hazards addressed:

- ❑ Ravenna (Italy) – Groundwater flooding, subsidence, and earthquakes - urban
- ❑ Dordrecht (the Netherlands) – floods and storm - urban
- ❑ SAVA (Sava River Basin) – floods – transboundary, international
- ❑ Seferihisar – Earthquakes - urban
- ❑ Baixa Limia-Serra do Xures Natural Park – wildfires – cross-border

The process:

The working group was coordinated by IHE in Water Education - Delft, who served as organizer and intermediary between them. The methodology followed was:

- The project objectives were structured in 8 working cycles.
- Every 6 months a working cycle was completed and another one started. The completion of a working cycle was marked by a workshop between the Open Labs and their stakeholders.
- Every month the coordinator of the working group and the Open Labs held a meeting in which they reported the work done and their challenges. These meetings were used as platforms for exchanges between and among Open Labs.

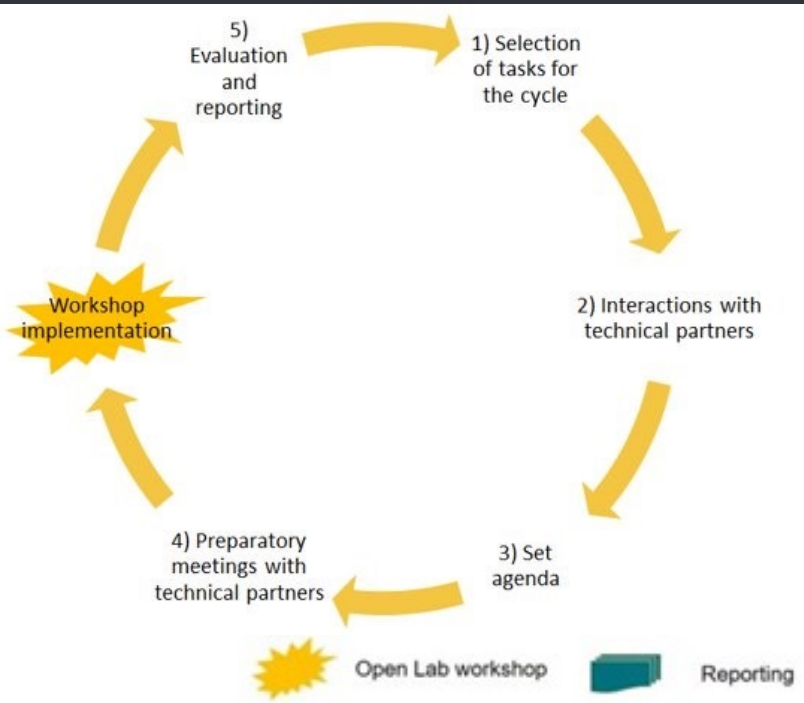


- At the completion of each working cycles, the Open Labs completed the writing of their WS reports in the Template for their individual Deliverables.
- During each General Assembly (at the end of each cycle), the working group coordinator and the Open Labs presented their work and plans for the following working cycles.
- Every reporting period, the working group coordinator prepared a report which each Open Lab complemented with details on their achievements during the reporting period (there are 3 reporting periods).
- In addition, the Open Labs held peer-learning experiences bilaterally and all together (through their monthly meetings). These occasions allow them to share experiences and thoughts on specific topics.

Working cycles in a nutshell:

The working cycles were as follow:

WS1 – Definition and scope of Open Labs
WS2 – Resilience assessment and monitoring framework
WS3 – Collaborative cultural heritage characterization
WS4 – Co-creation of tools and solutions
WS5 – Validation of tools
WS6 – Testing of tools and feed-back
WS7/8 – Lessons learnt and transferability



Main outputs

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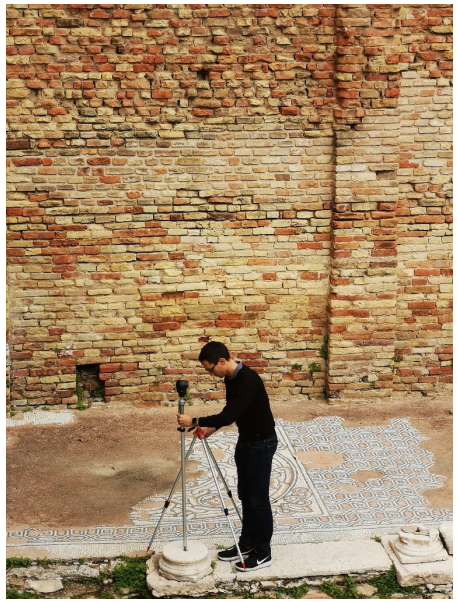
Ravenna Open Lab

- Implementation of an **interdisciplinary surveying strategy and monitoring sensor network**, spacing in the fields of structural, geotechnical, hydraulic engineering, geomatics, and technology of materials.
- **Involvement of University students for surveys and analysis**, resulting in multiple Master thesis, and lab-based and research activities.
- **Development of models** to investigate in detail certain aspects of the area (3D geomatics model, structural numerical model, model for evaluation of future flooding scenarios)
- **Participation to researchers and practitioners events and congresses** to disseminate the work done within the project
- Participation to events to **enhance the knowledge of the project activities** and raise awareness on the topics at community level.
- Development of **a Preventive Conservation and Programmed Maintenance Plan** for the Area



Dordrecht Open Lab

- Risk assessment method developed and tested.
- Dordrecht water safety strategy reinforced by the use of the IMMERSITE – raising awareness among its citizens.
- Co-development of the IMMERSITE SHELTER Tool to raise local awareness on high water and floods.
- 1 MSc thesis

SAVA Open Lab

- Cultural and historical heritage sites located within flood prone areas have been mapped in five riparian countries
- Spatial and attribute data for more than 1.200 heritage assets endangered by floods have been collected
- Sava GIS Geoportal and related web-based tools for processing, managing, creating, and supporting service-based data exchange have been improved
- A background for the flood impact analyses on cultural heritage sites – developed
- Networking between relevant authorities – from six riparian countries of the Sava River Basin, responsible for the cultural heritage, flood management, emergency responders and civil protection – established
- Sava Youth Parliament – a platform for the younger generation to have their voices heard – supported.

Seferihisar Open Lab

- The museum of İzmir and the civilian defense of Seferihisar have expressed that they do not normally have regular meetings like SHELTER stakeholder meetings and these lead to useful conversations between them
- In collaboration with UPV/EHU the report on Adobe (mug bricks) and earth rammed (mug buildings) for SEFERIHISAR. This generates local knowledge on earthquakes and heatweaves in vernacular architecture.
- The municipality is addressing climate mitigation in separate planning efforts.

Baixa Limia-Serra do Xures National Park Open Lab

- Metadata for the 3D model and the impact assessment model
- **Germplasm bank** with specific information to collect, store and allow germination for 19 regular species and 58 priority species. Seeds are from the Park, so are more resilient to climate conditions and will help prevent the spread of fires.
- To achieve integration with local agents, the Open Lab interviewed 17 associations and developed an **Action Plan** with 7 themes of action, 8 objectives, and 13 actions.
- **Educational and Awareness activities**: More than 350 young people from 7 high schools visited the Natural Park and received training about the cultural and natural heritage of the area and its resilience.
- Field techniques were applied over an oak forest mass to test how **natural-based solutions** can increase climate resilience and help to prevent the fire expansion

Highlights

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Monitoring indicators

A tailor-made list of monitoring indicators adapted to each Open Lab according to its local objectives was developed between work cycle 2 and work cycle 4.
This tailor-made list is based on indicator belonging to the following categories:

(1) collaboration,
(2) tools,
(3) knowledge exchange,
(4) plans,
(5) data collection, and
(6) assessment.

These indicators were taken into account in the preparation of lessons about the validation and replicability of SHELTER results.

Exchange of knowledge within open labs

Introduction to the Dutch Delta Program: Room for the River Visit the lower part of the river rural development

- ❖ Noordwaard depoldering
- ❖ Visit the upper part of the river urban development

High-water walk in Dordrecht

- ❖ Flooding protection
- ❖ Historical facts
- ❖ Evacuation shelter (planning)

IMMERSITE tool: demonstration

Dijkmagazijn foundation: presentation

Museum mill Overwaard: protection

Zeeuws Museum: emergency plan (procedures)

COVRA: storing vulnerable objects during a disaster

Lecture by Prof. Fabio Castelli, UNESCO Chair Florence University

Lecture by Dr. Louis Durrant (ULIEGE)

Several workshops with the SAVA and DORD experts

- overarching theme
  - flood risk planning and emergency management to improve the sustainable cultural heritage protection
- participants
  - a total of about 20 participants including the project partners and external experts
  - 15 are delegates from the Sava River Basin countries / members of the Task Group (one per organization)
- duration, timing and place
  - 3 working days
  - September 12-14, 2022
  - Delft/Dordrecht/Kinderdijk UNESCO WH site/Zeeland (Middelburg and Vlissingen)

Key challenges

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Key challenges

- **Stakeholders engagement** – Most of the project was conducted online as it was during the period of the COVID-19 restrictions. This affected influenced the synergies with stakeholders and their engagement.
- Feedback from stakeholders on the usability of the tools
- **Rotation of personnel –** During the project several Open Labs and working group coordinators changed positions and left the project – This brought constant periods of readjustment within the Open lab and working group teams.
- **Mobilization for local actions** – budgetary restrictions
- **Differences in competencies and responsibilities between partners –** e.g., Small Medium Enterprises versus international organizations

Conclusions

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Reflections

Climate change is having multiple effects not only in our daily life but also in our cultural heritage. Therefore, it is of great relevance to identify mechanisms to help in this inquiry. SHELTER has contributed to it by:

- Having the voice and experience of stakeholders in five different settings being heard and translated to digital tools.
- Test empirically the use of these tools and their potential in the protection of cultural heritage.
- Open-up a space of discussion with policy influencers on the role that digital tools should play in the protection of cultural heritage.
- Document the challenges facing the diffusion of these digital tools.

THANK YOU!

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